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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,094	04/01/2004	Daniel James Branagan	NANO003U	9485

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EXAMINER

EDMONDSON, LYNNE RENEE

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 06/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/816,094

Applicant(s)

BRANAGAN, DANIEL JAMES

Examiner

Lynne Edmondson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 8/23/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/24/04.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claim 17 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 4/27/06.
2. As the search for the subject matter of claims 8, 9 and 11 overlaps the search for subject matter of claims 7 and 10, claims 8, 9 and 11 will be examined.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claim 5 recites the limitation "said mixture" in lines 1 and 2. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.
5. Claim 6 recites the limitation "said mixture" in lines 1 and 2. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.
6. Claim 13 recites the limitation "said iron based metallic alloy" in line 1. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 10 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Pitcairn et al. (USPN 4624402).

Pitcairn teaches a method of forming a metallic overlay comprising supplying a metal substrate, supplying a metal alloy with a higher thermal expansion coefficient than the substrate by welding, melting the alloy on the substrate and forming a metallurgical bond and causing the alloy to shrink thereby developing a residual compressive stress in the alloy (figure 1 and col 2 lines 15-50). Although there is no disclosure that the residual stress does not exceed the yield strength, it is presumed that this condition would be required. Presumably if the stress were to exceed the yield strength, cracking or peeling or would be expected.

9. Claims 1-3, 11 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated Kloft et al. (USPN 6280796 B1).

Kloft teaches a method of forming a metallic overlay comprising supplying a metal substrate, supplying a metal alloy with a higher thermal expansion coefficient than the substrate by thermal spraying (col 5 lines 65-67), melting the alloy on the substrate and forming a metallurgical bond and causing the alloy to shrink thereby developing a residual compressive stress in the alloy (figure 1 and 5 lines 1-40). The alloy comprises at least 50% Fe with Cr, Mo, W, B, C, Si and Mn (col 5 lines 1-9 and col 6 lines 15-29). Although there is no disclosure that the residual stress does not exceed the yield strength, it is presumed that this condition would be required. Presumably if the stress were to exceed the yield strength, cracking or peeling or would be expected.

10. Claims 1, 10, 11 and 14-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Keshavan et al. (USPN 5535838).

Keshavan teaches a method of forming a metallic overlay (50) comprising supplying a metal substrate (20), supplying a metal alloy (col 5 lines 45-50) with a higher thermal expansion coefficient than the substrate by welding or thermal spraying (col 2 lines 5-23), melting the alloy on the substrate and forming a metallurgical bond and causing the alloy to shrink thereby developing a residual compressive stress in the alloy. The metal alloy has a strength greater than 1520 MPa (col 6 lines 13-25) and a hardness greater than about 850 kg/mm² (col 5 lines 45-50).

11. Claims 1-4, 10 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Subramanian et al. (USPN 6749894 B2).

Subramanian teaches a method of forming a metallic overlay comprising supplying a metal substrate, supplying a metal alloy with a higher thermal expansion coefficient than the substrate, melting the alloy on the substrate and forming a metallurgical bond and causing the alloy to shrink thereby developing a residual compressive stress in the alloy (col 1 lines 39-58). The metal alloy comprises at least 90% Fe, Cr, Mo and W with at least 50% Fe, at least about 25.3% Cr, 1% Mo, 1.8% W, 3.5% B, up to about 1% C, about 0.8% Si and up to about 1% Mn (col 3 line 55 – col 4 line 13, col 4 lines 35-61 and claims 5 and 6). The alloy is applied by welding or thermal spraying (col 5 line 66 – col 6 line 9).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 7-9 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian et al. (USPN 6749894 B2).

Subramanian teaches a method of forming a metallic overlay comprising supplying a metal substrate, supplying a metal alloy with a higher thermal expansion coefficient than the substrate, melting the alloy on the substrate and forming a metallurgical bond and causing the alloy to shrink thereby developing a residual

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compressive stress in the alloy (col 1 lines 39-58). The metal alloy comprises at least 90% Fe, Cr, Mo and W with at least 50% Fe, at least about 23-26% Cr, 1-1.2% Mo, 1.4-1.8% W, about 3.5% B, up to about 1% C, about 0.8% Si and up to about 1% Mn (col 3 line 55 – col 4 line 13, col 4 lines 35-61 and claims 5 and 6). The alloy is applied by welding or thermal spraying (col 5 line 66 – col 6 line 9). However the compositions are slightly different. Neither are expansion coefficients, strengths, or hardness values disclosed.

It would have been obvious to one of ordinary skill in the art at the time of the invention that about 1%C would be included in the range of about 0.9-1.2% C, about 0.8% Si would be included in the range of about 0.5-1.0% Si, and about 1% Mn would be included in the range of about 0.8% Mn. The term “about” allows for a slight extension of the range. It would be expected that similar compositions bonded to similar substrates in a similar manner would have similar physical properties including but not limited to expansion coefficients, strengths, and hardness values.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kanda (US 2005/0161816 A1, TEC of several materials including Al), Rairden, III (USPN 4101715, TEC superalloys), Darolia et al. (US 2005/0069650, overlay, welding, spraying), Masaoka et al. (USPN 4234119), Long (USPN 4609577), Bornstein et al. (USPN 5034284) and Earl et al. (USPN 2464591 A).

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne Edmondson whose telephone number is (571) 272-1172. The examiner can normally be reached on Monday through Thursday from 6:30 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lynne Edmondson
Primary Examiner
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Handwritten signature of Lynne Edmondson, dated 6/24/02.

LRE